Name: Enrolment No:	

UPES

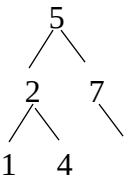
End Semester Examination, May 2023

Course: Algorithms for Biomedical Engineering **Semester: II**

Program: B.Tech (Biomedical Engineering) **Time : 03 hrs.**

Course Code: HSBE1002 **Max. Marks: 100**

Instructions:

S. No.		Marks	CO
	SECTION A **(5Qx4M=20Marks)**		
Q 1	What is searching? Explain the different searching algorithms.	**4**	**3**
Q 2	What is a binary search tree?	**4**	**2**
Q 3	What is a data structure? Explain its importance in programming.	**4**	**1**
Q 4	What is the time complexity of an insertion sort algorithm? How does it compare to other sorting algorithms?	**4**	**3**
Q 5	What is the time complexity of an algorithm? Explain the Big-O notation.	**4**	**1,2,3**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Explain the concept of divide and conquer in sorting algorithms.	**10**	**3**
Q 7	Consider the following binary tree:  Perform a pre-order and post-order traversal of this tree and show the order in which the nodes are visited. **OR** Write an algorithm to explain the different operations that can be performed on a linked list, such as insertion, deletion, and traversal.	**10**	**2** **1**
Q 8	Explain the concept of a graph data structure and provide an example of how it can be used in a real-world scenario.	**10**	**2**
Q 9	Discuss the advantages and disadvantages of using a linked list over an array for data structure.	**10**	**1**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Describe the process of sorting a dataset using the quick sort algorithm. Discuss its time complexity, as well as any potential drawbacks to using this algorithm for sorting. (12+4+4) **OR**	**20**	**3**

	Explain the concept of a tree and its properties. Explain the different types of trees with examples. (10+10)		**2**
Q 11	Define a queue. Explain the implementation of all queue operations using a linked list. (5+15)	**20**	**1**